



Euphrasia bowdeniae

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The following information is provided to assist authors of Species Impact Statements, development and activity proponents, and determining and consent authorities, who are required to prepare or review assessments of likely impacts on threatened species pursuant to the provisions of the *Environmental Planning and Assessment Act 1979*. These guidelines should be read in conjunction with the NPWS *Information Circular No. 2: Threatened Species Assessment under the EP&A Act: The '8 Part Test' of Significance* (November 1996).

Survey

E. bowdeniae is best surveyed during the flowering period when it is easier to identify, particularly on inaccessible rock faces. Although occurring in a specific habitat, sterile plants are small, inconspicuous and superficially similar to many other heath plants. Plants may die down during winter and be hidden among other plants.

E. bowdeniae is most easily confused with sterile plants of *Xanthosia pilosa*, *Mitrasacme polymorpha* and *Bauera microphylla*. *E. bowdeniae* can be distinguished from these plants by the opposite leaves (i.e. not alternate or whorled), the entire leaves (often divided in *Xanthosia*) and one pair of teeth along margins, or entire. No other species of *Euphrasia* grows on rock faces in the local area.

Surveys for *E. bowdeniae* should be concentrated along steep cliff-lines and wet to damp rock faces in the Upper Blue Mountains. Although potential cliff-face habitat is relatively widespread in this region, occurrences are rare. Suitable habitat has been surveyed (out of flowering season) at Mt. Solitary, Katoomba Falls, Leura and Blackheath (1999). Potential habitat occurs on inaccessible cliff faces that are best surveyed with binoculars.

Life cycle of the species

The biology and life cycle of *E. bowdeniae* is poorly known. Populations are thought to be rare, small and isolated with probable low genetic diversity.

Observations of one population indicate that most plants are reproductively mature and produce seed, however, there appears to be limited recruitment of seedlings. This could be attributed to high seed mortality, poor germination rates, absence of available host plants or competition with other species for available resources. High seed mortality is likely due to limited soil availability, washing away of seed in rainwater or from seepage over rock faces, and fluctuating wet and dry periods. The extent and specificity of dependence on host plants is unknown but potentially could significantly affect the success of seedling establishment and growth. Competition from other plants, particularly in early stages of seedling establishment may also be critical with limited availability of soil for growth. The small shrub *Xanthosia pilosa* is noted to occur commonly in potential and known habitat, occupying a similar niche to *E. bowdeniae*. Mortality rates of older plants may also be significant as a result of wildfire, dry periods, competition, disturbance and dislodgment or loss of host plants.

There is no evidence of vegetative reproduction.

Any activity that has a detrimental effect on these critical stages of the life cycle, particularly seedling recruitment and death rates, may seriously impact on the viability of local populations.

Physical destruction of plants: Any loss of individuals is likely to be significant considering the rarity of *E. bowdeniae*. Likely impacts on populations include reduced seed production and regeneration potential, reduced genetic variability and increased vulnerability to chance events or environmental change.

Fire: *E. bowdeniae* has evolved largely in the absence of fire. Any increase in fire frequency has the potential to destroy

individuals and populations. Populations in drier sites or where there is little protection from rock faces are most vulnerable. The loss of seed in the soil seed bank may occur due to lethal temperatures in the shallow, poorly developed soils.

Habitat modification: Affects the lifecycle of *E. bowdeniae* by altering the ecological processes within suitable habitat. Such changes may result in the loss of individuals and a decline in regenerative ability. Habitat modification may include changes to moisture regime, reduced water quality, loss of associated host species, weed invasion and increased fire frequency.

Threatening processes

“High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition” is a key threatening process listed under the TSC Act. This process is relevant to this species.

Other potential threats to *E. bowdeniae* are trampling or damage associated with recreational activities and habitat disturbance and degradation.

Loss or damage of plants growing with *E. bowdeniae* may also be a threat if *E. bowdeniae* is parasitic on the roots of these plants. The extent of this dependence is unknown. Competition from these and other plants occupying a similar niche may also be significant. Habitat degradation could result from soil erosion caused by excessive runoff from cleared areas above or pollution of water.

In the longer-term the genetic diversity and evolutionary potential of *E. bowdeniae* may be threatened given that the populations are small, and isolated.

Viable local population

The size and nature of a viable population of *E. bowdeniae* is unknown. One local population of *E. bowdeniae* has survived for at least 17 years with around 20 plants recorded in 1999. Observations of this population indicate that recruitment is minimal. Close monitoring is needed to

determine any definite population trends. Small populations should be assumed viable until proved otherwise.

A significant area of habitat

Known habitat of *E. bowdeniae* is restricted to a very small area. Any area of habitat, therefore, is considered significant until further populations are found. An area of habitat that supports a range of ages, is likely to be of particular significance. New sites of *E. bowdeniae*, located outside of the current known distributional limits, would also be considered significant.

Isolation & fragmentation

E. bowdeniae occurs naturally in small and isolated populations associated with restricted cliff-face habitat.

Regional distribution

E. bowdeniae occurs in a specialised form of Montane Heath which is restricted to rock faces on major cliff-lines in the Upper Blue Mountains, within the Sydney Basin Bioregion. Known habitat within this landscape, however, is highly restricted with records only from the Wentworth Falls and Blackheath districts.

Limit of known distribution

E. bowdeniae has a limited distribution within the Upper Blue Mountains. Based on all known records the northern and western distributional limit of *E. bowdeniae* is at Blackheath and the southern and eastern limit is at Korowall Buttress, Mt. Solitary, south of Katoomba.

Adequacy of representation in conservation reserves

All historical records of *E. bowdeniae* with precise locational details occur within the Blue Mountains National Park. Based on limited information for number and size of populations, however, the species is not considered to be adequately conserved.

Critical habitat

Critical habitat cannot be declared for *E. bowdeniae* as it is not listed on Schedule 1 of the TSC Act.

For further information contact

Threatened Species Unit, Central Directorate, NPWS PO Box 1967, Hurstville NSW 2220 Phone 02 9585 6678 or visit our website at www.npws.nsw.gov.au

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